



2021-22 Proposed CTE Programs of Study & Course Revisions

The following are proposed revisions to the 2021-22 programs of study based on the annual program of study justification process conducted by the department.

New and revised CTE courses will be reviewed on first reading by the Tennessee State Board of Education on July 24, 2020. [Open Comment](#) will be available for public feedback to proposed changes from July 27-August 26, 2020. Second and final reading by the Tennessee State Board of Education will occur on November 6, 2020. If approved, these changes will take effect for the 2021-22 school year.

For additional information on courses or programs of study in the 16 career clusters, please reach out to CTE.Standards@tn.gov or visit our web page at <https://tn.gov/education/topic/career-clusters>.

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Advanced Manufacturing

The following are **proposed changes** to courses within this career cluster. Program of study justifications for Advanced Manufacturing are available on the [career cluster website](#).

Program of study name change: Electromechanical Technology to Industrial Maintenance Technology.

Advanced Industrial Maintenance: Course name change (from Introduction to Electromechanical) due to program name change from Electromechanical Technology to Industrial Maintenance Technology. The new name is better recognized in the industry and postsecondary institutions and is recommended by the Tennessee Advance Manufacturing Advisory Council, CTE directors and teachers. The same rigorous standards remain in the course.

Introduction to Industrial Maintenance: Course name change (from Advanced Electromechanical Technology) due to program name change from Electromechanical Technology to Industrial Maintenance Technology. The new name is better recognized in the industry and postsecondary institutions and is recommended by the Tennessee Advance Manufacturing Advisory Council, CTE directors and teachers. The same rigorous standards remain in the course.

Principles of Manufacturing: Minor course standards revisions reflect changes in the manufacturing industry. Standard 35 is reworded to introduce students to the Fourth Industrial Revolution (Industry 4.0) and to emphasize how 3D printing is used in the manufacturing process. Revisions are recommended by the Tennessee Advance Manufacturing Advisory Council, CTE directors and teachers.

Robotics and Automated Systems: Minor course standards revision reflects change in the manufacturing industry. Language is added to Standard 4 to ensure students have studied collaborative robots. Revision is recommended by the Tennessee Advance Manufacturing Advisory Council, CTE directors and teachers.

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Industrial Maintenance Technology	Principles of Manufacturing (C13H05)	Introduction to Industrial Maintenance (C13H##)	Advanced Industrial Maintenance (C13H##) -or- Dual Enrollment Electromechanical Technology I (C13H02)	Manufacturing Practicum (C13H08) -or- Dual Enrollment Electromechanical Technology II (C13H19)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	Industry Certification: Production Certification (CPT) Safety Module	Industry Certification for C13H13: OSHA 30 General Industry	Industry Certification for C13H08: Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module -and/or- OSHA 30 General Industry

Machining Technology	Principles of Manufacturing (C13H05)	Principles of Machining I (C13H09)	Principles of Machining II (C13H06) -or- Dual Enrollment Machining Technology I (C13H01)	Manufacturing Practicum (C13H08) -or- Dual Enrollment Machining Technology II (C13H20)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	Industry Certification: Production Certification (CPT) Safety Module	Industry Certification for C13H06: Production Certification (CPT) Quality Practices and Measurement Module -and/or- OSHA 30 General Industry	Industry Certification for C13H08: Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module -and/or- OSHA 30 General Industry
Mechatronics	Principles of Manufacturing (C13H05)	Digital Electronics (C13H07) -or- Robotics & Automated Systems (C13H15) -or- Project Lead the Way (PLTW) Computer Integrated Manufacturing (C21H25)	Mechatronics I ¹ (C13H16) -or- Dual Enrollment Mechatronics I (C13H04)	Mechatronics II ¹ (C13H17) -or- Manufacturing Practicum (C13H08) -or- Dual Enrollment Mechatronics II (C13H21)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	Industry Certification for C13H15: FANUC	Industry Certification for C13H16: OSHA 30 General Industry	Industry Certification for C13H17: Level 1 Siemens Certified Mechatronic Systems Assistant -and/or- OSHA 30 General Industry Industry Certification for C13H08: Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module -and/or- OSHA 30 General Industry

Welding	Principles of Manufacturing (C13H05)	Welding I (C13H12)	Welding II ² (C13H10) -or- Dual Enrollment Welding I (C13H03)	Manufacturing Practicum (C13H08) -or- Dual Enrollment Welding II (C13H18)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS) -and/or- OSHA 10 -and/or- Precision Measurement Instruments Certification (includes all subtests)	Industry Certification: AWS SENSE Entry Level Welder -and/or- NCCER Core Curriculum	Industry Certification for C13H10: AWS SENSE Advanced Level Welder or American Welding Society Certified Welder -and/or- OSHA 30 General Industry	Industry Certification for C13H08: Production Certification (CPT) Manufacturing Processes and Production Module and Maintenance Awareness Module -and/or- OSHA 30 General Industry

¹ Local dual credit and/or dual enrollment opportunities exist for this course.

² May be taught for 1 or 2 credits.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) course may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.

Agriculture, Food, & Natural Resources

The following are **proposed changes** to courses within this career cluster. Program of study justifications for Agriculture, Food, & Natural Resources are available on the [career cluster website](#).

Program of study name change: Agricultural Engineering and Applied Technologies to Agricultural Engineering, Industrial, and Mechanical Systems.

Agriscience: Course standard revisions reflect realignment with the new science state standards concepts to maintain the course as a lab science course.

Principles of Farm and Agribusiness Management: This is a new course name (from Principles of Agribusiness) with revised standards on skills and content knowledge needed for relevancy to prepare for training, postsecondary, and occupations in the agriculture segments. New standards #4 to include agriculture supply chain management. Added standard # 6 to address introduce SWOT (Strength, Weakness, Opportunities, & Threats) management analysis concepts. Added standard #9 to increase spreadsheet use and functions. Added standard #16 to address digital marketing concepts.

Organizational Leadership and Communications: Minor course standard revisions reflect changes in the communication industry. Revised standard #1 to clarify content. Added standard #2 to provided additional focus on postsecondary opportunities. Added standards #12 and #13 to address social media communications related to the agricultural industry.

Agricultural Business and Finance: Course content area and several standard revisions made to course to better align content and reflect changes in the agribusiness industry. Revised standard #1 to clarify content. Added standard #2 to provided additional focus on postsecondary opportunities in agribusiness and finance. Added standard #9 to increase spreadsheet management. Added standard #10 address use of financial platforms (multiple cloud-based tools.)

Principles of Agricultural Mechanics: This course was heavily revised to align course content areas, skills, and clarify language of standards. Added standards #3 – 5 to increase measurement, mathematical, and mechanical advantage concepts. Added standard #11 to introduce generator technology.

Agricultural Power and Equipment: This course was heavily revised to align course content areas, skills, and content knowledge. Added standards #18 and #19 to introduce precision agricultural technology.

Agricultural Fabrication and Biosystems Engineering: This is a new course name (from Agricultural and Biosystems Engineering) with revised standards on skills and content knowledge needed for relevancy and rigor to prepare for training, postsecondary, and occupations in the agriculture and related sectors. Added standard # to increase focus on career opportunities. Added standard #9 to address precision instrument technology.

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Agribusiness	Agriscience ¹ (C18H19)	Principles of Farm and Agribusiness Management (C18H##)	Organizational Leadership and Communications (C18H18) -or- Dual Enrollment Agribusiness I (C18H03)	Agricultural Business and Finance ² (C18H11) -or- Statewide Dual Credit Intro to Agribusiness (C18H10) -or- Dual Enrollment Agribusiness II (C18H32)
	Industry Certification: OSHA - 10		Industry Certification for C18H18: OSHA 30 General Industry	Industry Certification for C18H11: OSHA 30 General Industry
	Supervised Agricultural Experience (C18H23)			
Agricultural Engineering, Industrial, and Mechanical Systems	Agriscience ¹ (C18H19)	Principles of Agricultural Mechanics (C18H12)	Agricultural Power and Equipment (C18H13) -or- Dual Enrollment Agricultural Engineering & Applied Technologies I (C18H02)	Agricultural Fabrication and Biosystems Engineering (C18H##) -or- Unmanned Aircraft Systems in Agriculture (C18H40) -or- Dual Enrollment Agricultural Engineering & Applied Technologies II (C18H35)
	Industry Certification: OSHA - 10	Industry Certification: Precision Measurement Instruments Certification	Industry Certification for C18H13: OSHA 30 General Industry -and/or- Briggs and Stratton Basic Small Engine Certification	Industry Certification for C18H22: OSHA 30 General Industry -and/or- Briggs and Stratton Master Service Technician Industry Certification for C18H40: Remote Pilot License (FFA Part 107)
	Supervised Agricultural Experience (C18H23)			

Environmental and Natural Resource Management	Agriscience ¹ (C18H19)	Applied Environmental Science ¹ (C18H25) -or- Cambridge IGCSE Environmental Management (C18H07)	Plant and Soil Science (C18H15) -or- Dual Enrollment Environmental & Natural Resources Management I (C18H06) -or- IB Environmental Systems and Societies I (SL) (G03H36)	Natural Resources Management (C18H28) -or- Unmanned Aircraft Systems in Agriculture (C18H40) -or- AP Environmental Science (G03H25) -or- Dual Enrollment Environmental & Natural Resources Management II (C18H36) -or- IB Environmental Systems and Societies II (SL) (G03H34)
	Industry Certification: OSHA - 10		Industry Certification for C18H15: OSHA 30 General Industry	Industry Certification for C18H28: OSHA 30 General Industry Industry Certification for C18H40: Remote Pilot License (FFA Part 107)
	Supervised Agricultural Experience (C18H23)			
Food Science	Agriscience ¹ (C18H19)	Principles of Food Production (C18H29)	Food Science and Safety (C18H26) -or- Dual Enrollment Food Science I (C18H04)	Advanced Food Science (C18H24) -or- Dual Enrollment Food Science II (C18H37)
	Industry Certification: OSHA - 10		Industry Certification for C18H26: OSHA 30 General Industry	Industry Certification for C18H24: OSHA 30 General Industry
	Supervised Agricultural Experience (C18H23)			

Horticulture Science	Agriscience ¹ (C18H19)	Principles of Plant Science and Hydroculture (C18H30)	Greenhouse Management (C18H17) -or- Statewide Dual Credit Introduction to Plant Science (C18H09) -or- Dual Enrollment Horticulture Science I (C18H05)	Landscaping and Turf Science (C18H16) -or- Unmanned Aircraft Systems in Agriculture (C18H40) -or- Dual Enrollment Horticulture Science II (C18H33)
	Industry Certification: OSHA - 10		Industry Certification for C18H17: OSHA 30 General Industry	Industry Certification for C18H16: Tennessee Specific Industry Certification for Horticulture Science -and/or- Commercial Pesticide Certification Industry Certification for C18H40: Remote Pilot License (FFA Part 107)
	Supervised Agricultural Experience (C18H23)			
Veterinary and Animal Science	Agriscience ¹ (C18H19)	Small Animal Science (C18H20)	Large Animal Science (C18H27) -or- Dual Enrollment Veterinary & Animal Science I (C18H01)	Veterinary Science ¹ (C18H21) -or- Unmanned Aircraft Systems in Agriculture (C18H40) -or- Dual Enrollment Veterinary & Animal Science II (C18H34)
	Industry Certification: OSHA - 10		Industry Certification for C18H27: OSHA 30 General Industry	Industry Certifications for C18H21: TN Specific Industry Certification Animal Science -and/or- OSHA 30 General Industry Industry Certification for C18H40: Remote Pilot License (FFA Part 107)
	Supervised Agricultural Experience (C18H23)			

¹ Satisfies one lab science credit required for graduation. ² Satisfies ½ credit of Personal Finance required for graduation.

Available courses for elective credit in this cluster:

- ***Work-Based Learning: Career Practicum*** (C25H16) course may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- ***Introduction to Geographic Information Systems*** (C18H39) is a supplemental course which can be offered in addition to courses within the Agricultural Engineering and Applied Technologies program of study but does not count toward concentrator status.

Architecture & Construction

There are **no proposed changes** to programs of study within this career cluster. Program of study justifications for Architecture & Construction are available on the [career cluster website](#).

Questions about the courses and programs of study within this career cluster should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Architectural & Engineering Design	Architectural & Engineering Design I (C17H13)	Architectural & Engineering Design II (C17H14)	Architectural & Engineering Design III ¹ (C17H10) -or- Dual Enrollment Architectural & Engineering Design I (C17H04)	Engineering Practicum (C21H14) -and/or- AP Calculus (G02H24 or G02H25) -and/or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- Dual Enrollment Architectural & Engineering Design II (C17H28) -or- IB Physics II (SL) (G03H82)
			Industry Certification for C17H01: Certified Solidworks Associate -and/or- AutoCAD User	
Interior Design	Foundations of Interior Design (C17H12)	Residential Interior Design (C17H11)	Commercial Interior Design (C17H20) -or- Dual Enrollment Interior Design I (C17H05)	Advanced Interior Design (C17H19) -or- Dual Enrollment Interior Design II (C17H29)

Mechanical, Electrical, & Plumbing (MEP) Systems	Fundamentals of Construction (C17H15)	MEP Systems (C17H23)	HVAC (C17H17) -and/or- Electrical Systems (C17H16) -and/or- Plumbing Systems (C17H18) -or- Dual Enrollment Mechanical, Electrical, & Plumbing Systems I (C17H03)	Construction Practicum (C17H22) -or- Dual Enrollment Mechanical, Electrical, & Plumbing Systems II (C17H30)
	Industry Certification: NCCER Core Curriculum -and/or- OSHA 10	Industry Certification: Precision Measurement Instruments Certification (includes all subtests)	Industry Certifications for C17H17: HVAC Excellence, Heating, Electrical, Air Conditioning Technology (H.E.A.T.) -and/or- HVAC Excellence Employment Ready Certifications -and/or- Universal R-410A EPA Section 608 Universal Industry Certification for C17H16: NCCER Electrical Level One -and/or- OSHA 30 Construction Industry Certification for C17H18: NCCER Plumbing Level One	
Residential & Commercial Construction	Fundamentals of Construction (C17H15)	Residential & Commercial Construction I (C17H24)	Residential & Commercial Construction II ¹ (C17H25) -or- Dual Enrollment Residential & Commercial Construction I (C17H01)	Construction Practicum (C17H22) -or- Dual Enrollment Residential & Commercial Construction II (C17H31)
	Industry Certification: NCCER Core Curriculum -and/or- OSHA 10	Industry Certification: NCCER Construction Technology	Industry Certification for C17H25: OSHA 30 Construction	

Structural Systems	Fundamentals of Construction (C17H15)	Structural Systems I (C17H26)	Structural Systems II ¹ (C17H27) -or- Dual Enrollment Structural Systems I (C17H02)	Construction Practicum (C17H22) -or- Dual Enrollment Structural Systems II (C17H32)
	Industry Certification: NCCER Core Curriculum -and/or- OSHA 10	Industry Certification: NCCER Carpentry Level One -and/or- Precision Measurement Instruments Certification (includes all subtests)	Industry Certification for C17H27: NCCER Carpentry Level Two -and/or- OSHA 30 Construction	

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Introduction to Geographic Information Systems** (C18H39) is a supplemental course which can be offered in addition to courses within the Architectural and Engineering Design program of study but does not count toward concentrator status.
- **Welding I** (C13H12) is a supplemental course which can be offered in addition to courses within the MEP, Residential & Commercial Construction, and Structural Systems programs of study but does not count toward concentrator status.

Arts, Audio/Visual Technology, & Communications

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Arts, Audio/Visual Technology, & Communications are available on the [career cluster website](#).

Questions about the courses and programs of study within this career cluster should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Audio/Visual Production	A/V Production I (C11H01)	A/V Production II (C11H02)	A/V Production III (C11H03) -or- Dual Enrollment Audio/Visual Production I (C11H00)	Applied Arts Practicum (C11H07) -and/or- AP English Language and Composition (G01H17) -or- Dual Enrollment Audio/Visual Production II (C11H15)
Digital Arts & Design	Digital Arts & Design I (C11H06)	Digital Arts & Design II (C11H05)	Digital Arts & Design III (C11H16) -or- Dual Enrollment Arts & Design I (C11H08)	Applied Arts Practicum (C11H07) -and/or- AP Studio Art: 2-D Design (G05H30) -or- Dual Enrollment Arts & Design II (C11H09)
			Industry Certification for C11H06: Adobe Certified Associate	
Fashion Design	Visual Art I (G05H08)	Foundations of Fashion Design (C11H17)	Fashion Design (C11H10) -or- Dual Enrollment Fashion Design I (C11H13) -or- Cambridge International AS Level Art & Design (C11H12)	Advanced Fashion Design (C11H11) -or- Dual Enrollment Fashion Design II (C11H14)

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Journalism** (G01H15) is a supplemental course which can be offered in addition to courses within the Audio/Visual Production program of study but does not count toward concentrator status.

Business Management & Administration

The following are **proposed changes** to courses within this career cluster. Marketing materials and program of study justifications for Business Management & Administration are available on the [career cluster website](#).

Advanced Computer Applications: Course description updated.

Business and Entrepreneurship Practicum: Course description updated. Revised standard #2 to include "Human resource development".

Business Communications: Revised standard #8 to include "e-mail messages". Added standards are #9, #22.

Business Management: Revised standard #21 to include "code of conduct and business ethics". Added standard #23.

Computer Applications : Added standard #4.

Health Information Technology: Removed standard related to history of health informatics.

Health Services Administration Practicum: Course description updated.

Human Resource Management: Revised standard #3 to include HRMS, revised standard #4 to include modern recruitment, revised standard #5 to include personality assessments, revised standard #12 to include wellness and workers compensation benefits, revised standard #15 to address onboarding, revised standard #27 to clarify language. Added standard #13.

Human Resource Management Practicum: Revised standard #2 to include "Employee demographics", revised standard #6 to clarify language.

Introduction to Business and Marketing: Revised standard #7 to include the impact of emerging technologies, revised standard #9 to include impact of Federal Reserve, revised standard #10 to include four types of business ownership. Added standard #14.

Program of Study	Level 1	Level 2	Level 3	Level 4
Business Management	Introduction to Business & Marketing (C12H26)	Business Communications (C12H16) -or- Accounting I (C29H00) -or- Cambridge IGCSE Accounting (C29H08)	Business Management (C12H17) -or- Statewide Dual Credit Introduction to Business (C12H44) -or- Dual Enrollment Business Management I (C12H01) -and/or- Principles of Management CLEP -and/or- Cambridge AS Business (C12H14)	Business & Entrepreneurship Practicum (C12H35) -and/or- Virtual Enterprise International ¹ (C12H23) -or- Dual Enrollment Business Management II (C12H47) -and/or- Principles of Management CLEP
			Industry Certification for C12H17: Google Suite	
Health Services Administration	Introduction to Business & Marketing (C12H26) -or- Health Science Education (C14H14)	Health Information Technology (C12H34)	Business Management (C12H17) -or- Statewide Dual Credit Introduction to Business (C12H44) -or- Dual Enrollment Health Services Administration I (C12H03) -or- Cambridge AS Business (C12H14)	Health Services Administration Practicum (C12H38) -or- Dual Enrollment Health Services Administration II (C12H49)
			Industry Certification for C12H17: Google Suite	

Human Resources Management	Introduction to Business & Marketing (C12H26)	Business Communications (C12H16)	Human Resources Management (C12H36) -or- Dual Enrollment Human Resources Management I (C12H39)	Human Resources Management Practicum (C12H37) -or- Dual Enrollment Human Resources Management II (C12H50)
			Industry Certification for C12H36: Google Suite	
Office Management	Computer Applications (C12X00)	Business Communications (C12H16)	Business Management (C12H17) -or- Statewide Dual Credit Introduction to Business (C12H44) -or- Dual Enrollment Office Management I (C12H02) -and/or- Principles of Management CLEP -or- Cambridge AS Business (C12H14)	Advanced Computer Applications (C12H25) -or- Dual Enrollment Office Management II (C12H48) -and/or- Information Systems CLEP
			Industry Certification for C12H17: Google Suite	Industry Certifications for C12H25: Microsoft Office Specialist: (Excel) (PowerPoint) (Word) -and/or- Microsoft Office Expert -and/or- Microsoft Officer Master

¹ Satisfies ½ credit of Economics required for graduation.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **American Business Legal Systems** (C12H20) and **Business Economics** (C12H21) are supplemental courses which can be offered in addition to courses within the Business Management and Human Resources Management programs of study but do not count toward concentrator status.

Education & Training

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Education & Training are available on the [career cluster website](#).

Questions about the courses and programs of study within this career cluster should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Early Childhood Education Careers	Early Childhood Education Careers I (C32H06)	Early Childhood Education Careers II (C32H07)	Early Childhood Education Careers III (C32H08) -or- Dual Enrollment Early Childhood Education Careers I (C32H10)	Early Childhood Education Careers IV (C32H09) -or- Dual Enrollment Early Childhood Education Careers II (C32H18)
	Industry Certification for C32H06 and C32H07: TECTA Center-Based Orientation Certificate			Industry Certification for C32H09: Child Development Associate (CDA)
Educational Therapy and Support	Educational Therapy and Support I (C32H12)	Educational Therapy and Support II (C32H13)	Educational Therapy and Support III (C32H14) -or- Dual Enrollment Educational Therapy and Support I (C32H16)	Educational Therapy and Support Practicum (C32H15) -or- Dual Enrollment Educational Therapy and Support II (C32H19)
Teaching as a Profession (K-12)	Fundamentals of Education (C32H00)	Teaching as a Profession I (C32H01)	Teaching as a Profession II (C32H02) -or- Dual Enrollment Teaching as a Profession (K-12) I (C32H04)	Teaching as a Profession Practicum (C32H03) -or- Dual Enrollment Teaching as a Profession (K-12) II (C32H05)

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Lifespan Development** (C19H17) is a supplemental course which can be offered in addition to courses within the Early Childhood Education Careers program of study but does not count toward concentrator status.

Finance

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Finance are available on the [career cluster website](#).

Questions about the courses and programs of study within this career cluster should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Accounting	Introduction to Business & Marketing (C12H26)	Accounting I (C29H00) -or- Cambridge IGCSE Accounting (C29H08)	Accounting II (C29H01) -or- Dual Enrollment Accounting I (C29H05) -or- Cambridge AS Accounting (C29H06)	Financial Planning (C29H02) -or- Statistics (G02H37) -or- AP Statistics (G02H26) -and/or- Dual Enrollment Accounting II (C29H07) -and/or- Financial Accounting CLEP
			Industry Certification for C29H01: Quick Books Certified User	
Banking and Finance	Introduction to Business & Marketing (C12H26)	Accounting I (C29H00) -or- Cambridge IGCSE Accounting (C29H08)	Banking and Finance (C29H03) -or- Dual Enrollment Banking & Finance I (C29H09)	Financial Planning (C29H02) -or- Dual Enrollment Banking & Finance II (C29H10)

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Personal Finance** (C29H11) is a course required for graduation but does not count toward concentrator status in a program of study.

Government & Public Administration

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Government & Public Administration are available on the [career cluster website](#).

Questions about the courses and programs of study within this career cluster should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Leadership in Government	JROTC I (G08H04)	JROTC II (G08H05)	U.S. Government and Civics (G04H12) -or- JROTC III (G08H06) -or- Dual Enrollment Leadership in Community Emergency Response I (C15H22)	Success Skills in Service Learning (C25H15) -or- JROTC IV (G08H07) -or- Dual Enrollment Leadership in Community Emergency Response II (C15H23)
Public Management and Administration	Principles of Public Service (C15H14)	Public Management and Administration (C15H16)	Public Law and Budgeting (C15H15) -or- Dual Enrollment Public Management & Administration I (C15H06)	AP US Government & Politics (G04H26) -or- Success Skills Through Service Learning (C25H15) -or- Dual Enrollment Public Management & Administration II (C15H24)

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.

Health Science

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Health Science are available on the [career cluster website](#).

Questions about the courses and programs of study within this career cluster should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Diagnostic Services	Health Science Education (C14H14)	Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Diagnostic Medicine (C14H12) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Diagnostic Medicine (C14H12) -or- Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Dual Enrollment Diagnostic Services I (C14H02) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Cardiovascular Services (C14H18) -and/or- Clinical Internship (C14H11) -or- Dual Enrollment Diagnostic Services II (C14H26)
		Industry Certification for C14H12: OSHA 10 General Industry	Industry Certification for C14H12: OSHA 10 General Industry	Industry Certification following C14H18 AND C14H11: Certified EKG Technician
Emergency Services	Health Science Education (C14H14)	Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Medical Therapeutics (C14H15) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Medical Therapeutics (C14H15) -or- Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Dual Enrollment Emergency Services I (C14H04) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Emergency Medical Services ¹ (C14H13) -or- Emergency Medical Services Practicum (C14H24) -or- Dual Enrollment Emergency Services II (C14H29)
		Industry Certification for C14H15: OSHA 10 General Industry	Industry Certification for C14H15: OSHA 10 General Industry	Industry Certification: Emergency Medical Responder (First Responder)

Nursing Services	Health Science Education (C14H14)	Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Medical Therapeutics (C14H15) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Medical Therapeutics (C14H15) -or- Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Dual Enrollment Nursing Services I (C14H03) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Nursing Education (C14H16) -and/or- Clinical Internship (C14H11) -or- Dual Enrollment Nursing Services II (C14H27)
		Industry Certification for C14H15: OSHA 10 General Industry	Industry Certification for C14H15: OSHA 10 General Industry	Industry Certification for C14H16: Certified Nursing Assistant (CNA) -and/or- Industry Certification following C14H16 AND C14H11: Certified Patient Care
Sport and Human Performance	Health Science Education (C14H14)	Anatomy and Physiology ¹ (G03H31 or C14H09) -or- Rehabilitation Careers (C14H08) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Anatomy and Physiology ¹ (G03H31 or C14H09) if the student did not take it as Level 2, he/she must take it as Level 3 course. For students who took Level 2 A&P, choices include: Rehabilitation Careers (C14H08) -or- Medical Therapeutics (C14H15) -or- Dual Enrollment Exercise Physiology I (C14H06) -or- Dual Enrollment Anatomy and Physiology (G03H43) -or- IB Sports, Exercise, & Health Science I (SL) (G03H39)	Exercise Science (C14H22) -or- Clinical Internship (C14H11) -or- Dual Enrollment Exercise Physiology II (C14H30) -or- IB Sports, Exercise, & Health Science I (SL) (G03H40)

		Industry Certification C14H08: OSHA 10 General Industry	Industry Certification C14H08: OSHA 10 General Industry	Industry Certification following C14H22 AND C14H11: Certified Personal Trainer
Therapeutic Services	Health Science Education (C14H14)	Anatomy and Physiology ¹ (G03H31 or C14H09) -or- One option from Level 3 -or- Dual Enrollment Anatomy and Physiology (G03H43)	Anatomy and Physiology ¹ (G03H31 or C14H09) if the student did not take it as Level 2, he/she must take it as Level 3 course. For students who took Level 2 A&P, choices include: Dental Science (C14H21) -or- Pharmacological Science (C14H20) -or- Nutrition Science and Diet Therapy ¹ (C19H16) -or- Medical Therapeutics (C14H15) -or- Medical Assisting (C14H10) -or- Public Health and Epidemiology (C14H17) Dual Enrollment Therapeutic Services I (C14H05) -or- Dual Enrollment Anatomy and Physiology (G03H43)	Clinical Internship (C14H11) -or- Dual Enrollment Therapeutic Services II (C14H28) -or- Dual Enrollment Medical Assisting (C14H32)
			Industry Certification following C14H20 AND C14H11: Certified Pharmacy Technician Industry Certification following C14H21 AND C14H11: National Entry Level Dental Assistant (NELDA)	Industry Certification following C14H15 AND C14H11: Certified Clinical Medical Assistant Industry Certification for C14H11: OSHA 10 General Industry

¹ Satisfies one lab science credit for graduation.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Medical Terminology** (C14H07) is a supplemental course which can be offered in addition to courses within the Health Science career cluster but does not count toward concentrator status.
- **Dual Enrollment Medical Terminology** (C14H31) is a supplemental dual enrollment course which can

be offered in addition to courses within the Health Science career cluster but does not count toward concentrator status.

Hospitality & Tourism

The following are **proposed changes** to courses within this career cluster. Program of study justifications for Hospitality & Tourism are available on the [career cluster website](#).

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Culinary Arts	Culinary Arts I (C16H06)	Culinary Arts II (C16H07)	Culinary Arts III (C16H08) -or- Dual Enrollment Culinary Arts I (C16H01)	Culinary Arts IV (C16H09) -or- Dual Enrollment Culinary Arts II (C16H14)
			Industry Certification for C16H08: ServSafe Food Manager -and/or- Certified Fundamentals Cook (CFC)	Industry Certification for C16H09: ServSafe Food Manager -and/or- Certified Fundamentals Cook (CFC)
Hospitality and Tourism Management	Hospitality & Tourism Management I (C16H17) -or- Cambridge IGCSE Travel & Tourism (C16H03)	Hospitality & Tourism Management II (C16H18) -or- Cambridge International AS Level Travel & Tourism (C16H04)	Hospitality & Tourism Management III (C16H19) -or- Dual Enrollment Hospitality & Tourism Management I (C16H02)	Event Planning & Management (C16H12) -or- Dual Enrollment Hospitality & Tourism Management II (C16H15)
			Industry Certification for C16HXX: Certified Hospitality & Tourism Management Professional (CHTMP)	

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.

Human Services

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Human Services are available on the [career cluster website](#).

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Cosmetology	Cosmetology I (C19H12)	Cosmetology II (C19H14)	Cosmetology III (C19H13) -or- Dual Enrollment Cosmetology I (C19H04) -or- Dual Enrollment Cosmetology II (C19H23)	Cosmetology IV (C19H21) -or- Dual Enrollment Cosmetology III (C19H27) -or- Dual Enrollment Cosmetology IV (C19H28)
				Industry Certification for C19H21: TN Cosmetology & Barber Examiners— TN Cosmetologist 1010
Barbering	Barbering I (C19H09)	Barbering II (C19H10)	Barbering III (C19H11) -or- Dual Enrollment Barbering I (C19H05)	Entrepreneurship ¹ (C31H05) -or- Dual Enrollment Barbering II (C19H24)
			Industry Certification for C19H11: TN Cosmetology & Barber Examiners— TN Master Barber 1010	
Dietetics and Nutrition	Introduction to Human Studies (C19H19)	Nutrition Across the Lifespan (C19H15) -or- Cambridge IGCSE Food & Nutrition (C19H08)	Nutrition Science and Diet Therapy (C19H16) -or- Dual Enrollment Dietetics & Nutrition I (C19H03)	Human Services Practicum (C19H20) -and/or- Psychology (G04H15) -and/or- Sociology (G04H14) -or- Dual Enrollment Dietetics & Nutrition II (C19H22)
			Industry Certification for C19H16:	

			Tennessee Specific Industry Certification for Dietetics & Nutrition (in pilot)	
Human and Social Sciences	Introduction to Human Studies (C19H19)	Lifespan Development (C19H17)	Family Studies (C19H18) -or- Dual Enrollment Human and Social Sciences I (C19H02) -or- Cambridge IGCSE <u>Sociology</u> (G04H65) -or- Human Growth and Development CLEP	Human Services Practicum (C19H20) -and/or- Psychology (G04H15) -and/or- Sociology (G04H14) -or- Dual Enrollment Human and Social Sciences II (C19H26)
			Industry Certification for C19H18: Tennessee Specific Industry Certification for Human and Social Sciences (in pilot)	

¹ Satisfies ½ credit of Economics required for graduation.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.

Information Technology

The following are **proposed changes** to courses within this career cluster. Program of study justifications for Information Technology are available on the [career cluster website](#).

Cybersecurity I: This course was heavily revised to align learning and clarify language of standards.

Cybersecurity II: This course was heavily revised to align learning and clarify language of standards.

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Coding	Computer Science Foundations (C10H11) -or- Cambridge IGCSE Computer Science (C10H07)	Coding I (C10H14) -or- AP Computer Science Principles (G02H44)	Coding II (C10H15) -or- Mobile App Development (C10H22) -or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Coding I (C10H01)	Coding Practicum (C10H08) -and/or- AP Computer Science A (G02H45) -and/or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Coding II (C10H28) -or- Cambridge International AS Level Computer Science (C10H25)
	Industry Certification for C10H11: CompTIA IT Fundamentals		Industry Certification for C10H15: Microsoft Technology Associate Software Development Fundamentals -and/or- CIW Web Foundation -and/or- JavaScript Specialist -and/or- Advanced HTML5/CSS3	
Cybersecurity	Computer Science Foundations (C10H11)	Cybersecurity I (C10H19) -and/or- AP Computer Science Principles (G02H44)	Cybersecurity II (C10H20) -and/or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Cybersecurity I (C10H24)	Cybersecurity Practicum (C10H21) -and/or- AP Computer Science Principles (G02H44) Dual Enrollment Cybersecurity II (C10H31)

	Industry Certification for C10H11: CompTIA IT Fundamentals	Industry Certification for C10H19: CompTIA A+	Industry Certification for C10H20: CompTIA Network +	Industry Certification for C10H21: CompTIA Security + -and/or- Associate of ISC2
Networking Systems	Computer Science Foundations (C10H11)	Computer Systems (C10H10)	Networking (C10H13) -or- Dual Enrollment Networking Systems I (C10H02)	Cabling and Internetworking (C10H09) -and/or- IT Clinical Internship (C10H12) -or- Dual Enrollment Networking Systems II (C10H29)
	Industry Certification: CompTIA IT Fundamentals	Industry Certification: Comp TIA A+ -and/or- Cisco Certified Entry Network Tech (CCENT)	Industry Certification for C10H13: CompTIA Network + -and/or- Microsoft Technology Associate Infrastructure -and/or- Cisco IT Essentials PC Hardware & Software Certification -and/or- Cisco Certified Network Associate (CCNA)	
Web Design	Computer Science Foundations (C10H11) -or- Cambridge IGCSE Information and Communication Technology (C10H26)	Web Design Foundations (C10H16) -and/or- AP Computer Science Principles (G02H44)	Web Site Development (C10H17) -and/or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Web Design I (C10H03)	Web Design Practicum (C10H18) -and/or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Web Design II (C10H30)
	Industry Certification: CompTIA IT Fundamentals		Industry Certification: CIW Web Design Specialist -and/or- CIW Web Foundation -and/or- JavaScript Specialist -and/or- Advanced HTML5/CSS3	

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Introduction to Geographic Information Systems** (C18H39) is a supplemental course which can be offered in addition to courses within the Cybersecurity program of study but does not count toward concentrator

status.

Law, Public Safety, Corrections, & Security

The following are **proposed changes** to courses within this career cluster. Program of study justifications for Law, Public Safety, Corrections, & Security are available on the [career cluster website](#).

Criminal Justice I: This course was heavily revised to align learning and clarify language of standards.

Criminal Justice II: This course was heavily revised to align learning and clarify language of standards.

Criminal Justice III: This course was heavily revised to align learning and clarify language of standards.

Criminal Justice Practicum: This course was heavily revised to align learning and clarify language of standards.

Pre-Law I: This course was heavily revised to align learning and clarify language of standards.

Pre-Law II: This course was heavily revised to align learning and clarify language of standards.

Pre-Law III: This course was heavily revised to align learning and clarify language of standards.

Pre-Law Practicum: This is a new capstone course that provides a practicum experience for students as they develop an understanding of professional, legal, and ethical issues. This course will replace Success Skills in Service Learning for this program of study.

Unmanned Aircraft Systems for Criminal Justice: This course is an advanced course intended to meet the needs of specific applications of advanced UAS precision technologies specific to the law enforcement industry.

Questions about courses and programs of study should be directed to CTEStandards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Criminal Justice and Correction Services	Criminal Justice I (C30H00)	Criminal Justice II (C30H01)	Criminal Justice III: Forensic Criminal Investigations (C30H02) -or- Statewide Dual Credit: Criminal Justice (C30H11) ¹ -or- Dual Enrollment Criminal Justice and Correction Services I (C30H12) -or- Unmanned Aircraft Systems for Criminal Justice (C30H##)	Criminal Justice Practicum (C30H03) -or- Dual Enrollment Criminal Justice and Correction Services II (C30H13) -or- Unmanned Aircraft Systems for Criminal Justice (C30H##)

Fire Management Services	Principles of Fire and Emergency Services (C30H04)	Fire Prevention (C30H05)	Fire Science I (C30H06) -or- Dual Enrollment Fire Management Services I (C30H14)	Fire Science II (C30H07) -or- Dual Enrollment Fire Management Services II (C30H15)
Pre-Law	Pre-Law I (C30H08)	Pre-Law II (C30H09)	Pre-Law III (C30H10) -or- Dual Enrollment Pre-Law I (C30H16)	Success Skills in Service Learning- (C25H15) Pre-Law Practicum (C30H##) -or- AP U.S. Government and Politics (G04H26) -or- Dual Enrollment Pre-Law II (C30H17)

¹ Statewide Dual Credit Criminal Justice **requires** Criminal Justice I **and** Criminal Justice II as prerequisite courses. Students cannot take Statewide Dual Credit Criminal Justice without having already completed the first two courses in the program of study.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **American Business Legal Systems** (C12H20) is a supplemental course which can be offered in addition to courses within the Legal and Correction Services program of study but does not count toward concentrator status.

Marketing, Distribution & Logistics

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Marketing, Distribution & Logistics are available on the [career cluster website](#).

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Entrepreneurship	Introduction to Business & Marketing (C12H26)	Marketing and Management I: Principles ¹ (C31H00)	Entrepreneurship ¹ (C31H05) -or- Dual Enrollment Entrepreneurship I (C31H12) -or- Cambridge IGCSE Enterprise (C31H13)	Business & Entrepreneurship Practicum (C12H35) -or- Virtual Enterprise International ¹ (C12H23) -or- Dual Enrollment Entrepreneurship II (C31H14)
Marketing Management	Introduction to Business & Marketing (C12H26)	Marketing and Management I: Principles ¹ (C31H00)	Marketing and Management II: Advanced Strategies (C31H01) -or- Social Media Marketing and Analytics (C31H02) -or- Dual Enrollment Marketing Management I (C31H10) -and/or- Principles of Marketing CLEP	Advertising and Public Relations (C31H03) -or- Retail Operations ¹ (C31H04) -or- Event Planning & Management (C16H12) -or- Dual Enrollment Marketing Management II (C31H11) -and/or- Principles of Marketing CLEP
			Industry Certifications for C31H02: Hootsuite Platform Certification -and/or- Hootsuite Social Marketing Certification	

Supply Chain Management	Introduction to Business & Marketing (C12H26) -or- Marketing and Management I: Principles ¹ (C31H00)	Foundations of Supply Chain Management (C31H06)	Supply Chain Management I (C31H07) -or- Dual Enrollment Supply Chain Management I (C31H15)	Supply Chain Management II (C31H08) -or- Supply Chain Management Practicum (C31H09) -or- Dual Enrollment Supply Chain Management II (C31H16)
		Industry Certification for C31H06: Microsoft Office Specialist (Excel)	Industry Certification for C31H07: Certified Logistics Technician	

¹ Satisfies ½ credit of Economics required for graduation.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Business Communications** (C12H16) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.

STEM

The following are **proposed changes** to courses within this career cluster. Program of study justifications for STEM are available on the [career cluster website](#).

Engineering by Design (EBD) courses are now available for elective credit for the STEM career cluster.
Project Lead the Way (PLTW) courses are now available for elective credit for the STEM career cluster.

Questions about courses and programs of study should be directed to CTEStandards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Advanced STEM Applications	STEM I: Foundation (C21H15)	STEM II: Applications (C21H16) -or- AP Computer Science Principles (G02H44)	STEM III: STEM in Context (C21H17) -or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Advanced STEM Applications I (C21H32)	STEM IV: STEM Practicum (C21H18) -and/or- AP Calculus AB (G02H24) -or- AP Calculus BC (G02H25) -or- AP Computer Science A (G02H45) -or- AP Biology (G03H10) -or- AP Chemistry (G03H16) -or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- Dual Enrollment Advanced STEM Applications II (C21H33) -or- IB Biology II SL/HL (G03H69) -or- IB Physics II (SL) (G03H82)

	Industry Certification: Precision Measurement Instruments Certifications (Snap-On)	Industry Certification for C21H16: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User		
BioSTEM	BioSTEM I (C21H07)	BioSTEM II (C21H08)	BioSTEM III (C21H09)	BioSTEM Practicum (C21H10)
	Industry Certification: Precision Measurement Instruments Certifications (Snap-On)		Industry Certification: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User	
Engineering	Principles of Engineering and Technology (C21H04)	Engineering Design I (C21H05) -or- AP Computer Science Principles (G02H44) -or- Cambridge IGCSE Design and Technology (C21H03)	Engineering Design II (C21H06) -or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Engineering I (C21H00)	Engineering Practicum (C21H14) -and/or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- AP Computer Science A (G02H45) -or- Dual Enrollment Engineering II (C21H11) -or- Cambridge International AS <u>Design and Technology</u> (C10H05) -or- IB Physics II (SL) (G03H82)
	Industry Certification: Precision Measurement Instruments Certifications (Snap-On)	Industry Certification for C21H04: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor	Industry Certification for C21H06: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor	Industry Certification for C21H014: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor
Engineering by Design	Foundations of Technology (EBD) (C21H27)	Technological Design (EBD) (C21H28)	Advanced Design Applications (EBD) (C21H29) -and/or- Advanced Technological Applications (EBD) (C21H30)	Engineering Design (EBD) (C21H31)
Project Lead the Way	Introduction to Engineering (PLTW) (C21H19)	Principles of Engineering (PLTW) (C21H20)	Choice of the following: Aerospace Engineering (PLTW) (C21H21) -or-	Engineering Design and Development (PLTW) (C21H26)

			Civil Engineering & Architecture (PLTW) (C21H22) -or- Biotechnical Engineering (PLTW) (C21H23) -or- Digital Electronics (PLTW) (C21H24) -or- Computer Integrated Manufacturing (PLTW) (C21H25)	
Technology	Principles of Engineering and Technology (C21H04)	Digital Electronics (C13H07) -or- AP Computer Science Principles (G02H44)	Robotics & Automated Systems (C13H15) -or- AP Computer Science Principles (G02H44) -or- Dual Enrollment Technology I (C21H01)	Engineering Practicum (C21H14) -and/or- AP Physics (G03H27, G03H28, G03H24, or G03H29) -or- AP Computer Science A (G02H45) -or- Dual Enrollment Technology II (C21H12) -or- IB Physics II (SL) (G03H82)
	Industry Certification: Precision Measurement Instruments Certifications (Snap-On)	Industry Certification for C13H07: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User	Industry Certification for C13H15: FANUC	Industry Certification for C21H14: Certified Solidworks Associate (CSWA)- Academic -and/or- Autodesk Inventor Certified User

Note: Courses marked (EBD) are part of the *Engineering by Design* curriculum package and may require additional costs and training to implement. Courses marked (PLTW) are part of the *Project Lead the Way* curriculum package and may require additional costs and training to implement.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Introduction to Geographic Information Systems** (C18H39) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Foundations of Technology (EBD)** (C21H27) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Technological Design (EBD)** (C21H28) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Advanced Design Applications (EBD)** (C21H29) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Advanced Technological Applications (EBD)** (C21H30) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Engineering Design (EBD)** (C21H31) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Introduction to Engineering (PLTW)** (C21H19) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Principles of Engineering (PLTW)** (C21H20) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Aerospace Engineering (PLTW)** (C21H21) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Civil Engineering & Architecture (PLTW)** (C21H22) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Biotechnical Engineering (PLTW)** (C21H23) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Digital Electronics (PLTW)** (C21H24) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Computer Integrated Manufacturing (PLTW)** (C21H25) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.
- **Engineering Design and Development (PLTW)** (C21H26) is a supplemental course which can be offered in addition to courses within these programs of study but does not count toward concentrator status.

Transportation

There are **no changes** to programs of study within this career cluster based. Program of study justifications for Transportation are available on the [career cluster website](#).

Questions about courses and programs of study should be directed to CTE.Standards@tn.gov.

Program of Study	Level 1	Level 2	Level 3	Level 4
Automotive Maintenance and Light Repair	Maintenance and Light Repair I (C20H09)	Maintenance and Light Repair II (C20H10)	Maintenance and Light Repair III (C20H11) -or- Dual Enrollment Automotive Maintenance & Light Repair I (C20H01)	Maintenance and Light Repair IV (C20H12) -or- Dual Enrollment Automotive Maintenance & Light Repair II (C20H21)
			Industry Certification: Precision Measurement Instruments Certification (includes all subtests)	Industry Certification: Automotive Service Excellence Student Certification: Maintenance & Light Repair
Automotive Collision Repair	Introduction to Collision Repair (C20H20)	Collision Repair: Non-Structural ¹ (C20H13) -or- Collision Repair: Painting & Refinishing ¹ (C20H14)	Collision Repair: Non-Structural ¹ (C20H13) -or- Collision Repair: Painting & Refinishing ¹ (C20H14) -or- Dual Enrollment Automotive & Collision Repair I (C20H02)	Collision Repair: Non-Structural ¹ (C20H13) -or- Collision Repair: Painting & Refinishing ¹ (C20H14) -or- Collision Repair: Damage Analysis, Estimating, & Customer Service (C20H19) -or- Dual Enrollment Automotive & Collision Repair II (C20H23)
			Industry Certification for C20H13: I-CAR Refinish Technician ProLevel 1 or I-CAR Non-Structural Technician ProLevel 1 or Automotive Service Excellence Student Certification: Nonstructural Analysis/Repair Industry Certification for C20H14: Automotive Service Excellence Student Certification: Painting and Refinishing	

Aviation Flight	Introduction to Aerospace (C20H15)	Aviation I: Principles of Flight (C20H16)	Aviation II: Advanced Flight (C20H18) -or- Dual Enrollment Aviation Flight I (C20H03)	Unmanned Aircraft Systems Pilot (C20H29) -or- Dual Enrollment Aviation Flight II (C20H28)
				Industry Certification for C20HXX Remote Pilot Certification (FAA Part 107)

¹ May be taught for up to three credits. Implementation options vary; contact the career cluster consultant for more information.

Available courses for elective credit in this cluster:

- **Work-Based Learning: Career Practicum** (C25H16) may substitute for the Level 4 offering in all programs of study but does not count toward concentrator status.
- **Welding I** (C13H12) and **Welding II** (C13H10) are supplemental courses which can be offered in addition to courses within the Automotive Collision Repair program of study but do not count toward concentrator status.
- **Structural** may be taken at a participating postsecondary institution as a third- or fourth-level course within the Automotive Collision Repair program of study.
- Programs of study in the areas of *Aviation Maintenance* and *Diesel Technology* can be found at a Tennessee College of Applied Technology. Please look at regional campus to determine course offerings. The following dual enrollment course codes apply: **Dual Enrollment Aviation Maintenance** (C20H04) and **Dual Enrollment Diesel Technology** (C20H06).

Middle School

Career Cluster	6 th Grade	7 th Grade	8 th Grade
Advanced Manufacturing	Exploring Technology (EBD) (C25X01) Design and Modeling (PLTW) (C25X02) STEM Explorers (C25600)	Automation and Robotics (PLTW) (C25X03) Design and Modeling (PLTW) (C25X02) Inventions and Innovations (EBD)- (C25700) STEM Innovators (C25701)	Automation and Robotics- (PLTW) (C25X03) Energy and the Environment- (PLTW) (C25802) Flight and Space (PLTW) (C25803) Green Architecture (PLTW) (C25804) Magic of Electrons (PLTW) (C25805) Technological Systems (EBD) (C25800) Science and Technology (PLTW) (C25806) STEM Designers (C25801) Career Exploration* (C25X00)
Agriculture, Food, & Natural Resources		Introduction to Agricultural Sciences (C18X00)	Introduction to Agricultural Sciences (C18X00) Career Exploration* (C25X00)
Architecture & Construction	Design and Modeling (PLTW) (C25X02) Exploring Technology (EBD) (C25X01) STEM Explorers (C25600)	Automation and Robotics (PLTW) (C25X03) Design and Modeling (PLTW) (C25X02) Inventions and Innovations (EBD)- (C25700) STEM Innovators (C25701)	Automation and Robotics- (PLTW) (C25X03) Energy and the Environment- (PLTW) (C25802) Flight and Space (PLTW) (C25803) Green Architecture (PLTW) (C25804) Magic of Electrons (PLTW) (C25805) Technological Systems (EBD) (C25800) Science and Technology (PLTW) (C25806) STEM Designers (C25801) Career Exploration* (C25X00)
Arts, Audio/Visual Technology, & Communication	Design and Modeling (PLTW) (C25X02) Keyboarding (G10600)	Automation and Robotics (PLTW) (C25X03) Design and Modeling (PLTW) (C25X02) Keyboarding (G10700)	Automation and Robotics- (PLTW) (C25X03) Computer Applications (C12X00) Energy and the Environment- (PLTW) (C25802) Flight and Space (PLTW) (C25803) Green Architecture (PLTW) (C25804) Keyboarding (G10800) Magic of Electrons (PLTW) (C25805) Science and Technology (PLTW) (C25806) Career Exploration* (C25X00)

Business Management & Administration	Keyboarding (G10600)	Keyboarding (G10700)	Computer Applications (C12X00) Keyboarding (G10800) Career Exploration* (C25X00)
Education & Training	Introduction to Social Health ² (C19X00)	Introduction to Social Health (C19X00)	Introduction to Social Health (C19X00) Career Exploration* (C25X00)
Finance	Keyboarding (G10600)	Keyboarding (G10700)	Computer Applications (C12X00) Keyboarding (G10800) Career Exploration* (C25X00)
Government & Public Administration			Career Exploration* (C25X00)
Health Science		Introduction to Health Science (C14X00)	Introduction to Health Science (C14X00) Medical Detectives (PLTW) (C14801) Career Exploration* (C25X00)
Hospitality & Tourism			Career Exploration* (C25X00)
Human Services	Introduction to Social Health ² (C19X00)	Introduction to Social Health (C19X00)	Introduction to Social Health (C19X00) Career Exploration* (C25X00)
Information Technology	Design and Modeling (PLTW) (C25X02) Keyboarding (G10600) STEM Explorers (C25600)	Automation and Robotics (PLTW) (C25X03) Design and Modeling (PLTW) (C25X02) Keyboarding (G10700) STEM Innovators (C25701)	Automation and Robotics (PLTW) (C25X03) Computer Applications (C12X00) Energy and the Environment (PLTW) (C25802) Flight and Space (PLTW) (C25803) Green Architecture (PLTW) (C25804) Keyboarding (G10800) Magic of Electrons (PLTW) (C25805) Science and Technology (PLTW) (C25806) STEM Designers (C25801) Career Exploration* (C25X00) Computer Science Discoveries (C25X04)
Law, Public Safety, Corrections, & Security			Career Exploration* (C25X00)
Marketing, Distribution & Logistics	Keyboarding (G10600)	Keyboarding (G10700)	Computer Applications (C12X00) Keyboarding (G10800) Career Exploration* (C25X00)

STEM	Design and Modeling (PLTW) (C25X02) Exploring Technology (EBD) (C25X01) STEM Explorers (C25600)	Automation and Robotics (PLTW) (C25X03) Design and Modeling (PLTW) (C25X02) Inventions and Innovations (EBD) (C25700) STEM Innovators (C25701)	Automation and Robotics (PLTW) (C25X03) Energy and the Environment (PLTW) (C25802) Flight and Space (PLTW) (C25803) Green Architecture (PLTW) (C25804) Magic of Electrons (PLTW) (C25805) Science and Technology (PLTW) (C25806) STEM Designers (C25801) Technological Systems (EBD) (C25800) Career Exploration* (C25X00) Computer Science Discoveries (C25X04)
Transportation	Design and Modeling (PLTW) (C25X02) Exploring Technology (EBD) (C25X01) STEM Explorers (C25600)	Automation and Robotics (PLTW) (C25X03) Design and Modeling (PLTW) (C25X02) Inventions and Innovations (EBD) (C25700) STEM Innovators (C25701)	Automation and Robotics (PLTW) (C25X03) Energy and the Environment (PLTW) (C25802) Flight and Space (PLTW) (C25803) Green Architecture (PLTW) (C25804) Magic of Electrons (PLTW) (C25805) Science and Technology (PLTW) (C25806) STEM Designers (C25801) Technological Systems (EBD) (C25800) Career Exploration* (C25X00)

¹ *Keyboarding* may also be used with 4th and 5th grade students (G10400, G10500). ² *Introduction to Social Health* may also be used with 5th grade students (C19X00).

Note: Courses marked (EBD) are part of the *Engineering by Design* curriculum package and may require additional costs and training to implement. Courses marked (PLTW) are part of the *Project Lead the Way* curriculum package and may require additional costs and training to implement.